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United States Patent [19]

Bisset et al.

[11] **Patent Number:** **5,543,588**[45] **Date of Patent:** **Aug. 6, 1996**[54] **TOUCH PAD DRIVEN HANDHELD
COMPUTING DEVICE**[75] Inventors: **Stephen Bisset**, Palo Alto; **Robert J. Miller**, Fremont; **Timothy P. Allen**, Los Gatos; **Günter Steinbach**, Palo Alto, all of Calif.[73] Assignee: **Synaptics, Incorporated**, San Jose, Calif.[21] Appl. No.: **161,671**[22] Filed: **Dec. 3, 1993**
(Under 37 CFR 1.47)**Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 895,934, Jun. 8, 1992, and a continuation-in-part of Ser. No. 115,743, Aug. 31, 1993, Pat. No. 5,374,787.

[51] **Int. Cl.⁶** **G08C 21/00; G09G 5/00**[52] **U.S. Cl.** **178/18; 345/173**[58] **Field of Search** 178/18, 19; 341/33,
341/34; 345/173, 174[56] **References Cited****U.S. PATENT DOCUMENTS**

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Primary Examiner—Stephen Chin*Assistant Examiner*—Kevin Kim*Attorney, Agent, or Firm*—D'Alessandro & Ritchie[57] **ABSTRACT**

A handheld computing device comprises a thin enclosure having two opposing major faces. A display screen is disposed on a first one of the major opposing faces of the enclosure and a touch-sensitive object position detector input device is disposed on a second one of the major opposing faces of the enclosure. Computing device circuitry, circuitry for interfacing the touch-sensitive object position detector to the computing device circuitry, and circuitry for driving the display screen are all disposed within the enclosure.

4 Claims, 15 Drawing Sheets